THE UNIVERSITY OF TEXAS AT AUSTIN
Cockrell School of Engineering
Resume

FULL NAME: **Laxminarayan L. Raja** **TITLE:** **Professor**

ENDOWED POSITION: **L. B. (Preach) Meaders Professorship in Engineering**

DEPARTMENT: **Aerospace Engineering and Engineering Mechanics**

EDUCATION:

Indian Institute of Technology, Madras	Aerospace Engineering	B. Tech	1990
Texas A&M University	Nuclear Engineering	M.S.	1992
The University of Texas at Austin	Mechanical Engineering	Ph.D.	1996

PROFESSIONAL REGISTRATION:
Not Registered

CURRENT AND PREVIOUS POSITIONS:
Research Assistant, Department of Nuclear Engineering, Texas A & M University, College Station, TX, Aug. 1990 – May 1992
Research and Teaching Assistant (combined), Thermal/Fluids Section, Mechanical Engineering, The University of Texas at Austin, Austin, TX, Aug. 1992 – Jan. 1997
Post-doctoral Fellow, Division of Engineering, Colorado School of Mines, Golden, CO, Feb. 1997 – July 1999
Assistant Professor, Division of Engineering, Colorado School of Mines, Golden, CO, Aug. 1999 – Aug. 2002
Assistant Professor, Department of Aerospace Engineering and Engineering Mechanics, The University of Texas at Austin, Jan. 2002 – Aug. 2006
Associate Professor, Department of Aerospace Engineering and Engineering Mechanics, The University of Texas at Austin, Sept. 2006 – Aug 2012
Professor, Department of Aerospace Engineering and Engineering Mechanics, The University of Texas at Austin, Sept. 2012 – present
Founder and Mentor, Esgee Technologies Inc. 2003 – Nov 2022.

CONSULTING:
ITN Energy Systems, Wheatridge, Colorado, June 1999

MEMBERSHIPS IN PROFESSIONAL AND HONORARY SOCIETIES:
Member, The Combustion Institute, 1998
Member, The Electrochemical Society, 1999
Member, American Vacuum Society, 2001
Member, American Physical Society, 2003-onwards
Member, American Institute of Aeronautics and Astronautics, 2004-onwards
Member, SPIE Intl. Soc. of Optics and Photonics, 2022-present

PROFESSIONAL SOCIETY AND MAJOR GOVERNMENTAL COMMITTEES, EDITORIAL BOARDS, AND CONFERENCES ORGANIZED/CHAIRED:
Co-organizer, Editorial Room, 27th Symposium (International) on Combustion, Boulder, CO, Aug. 2-7, 1998.
Conference Session Chair, Spring 2000 Meeting of the Western States Section, The Combustion Institute, Session on "Catalysis and Sprays," Mar. 13-14, 2000.
Session Chair, 4th International Symposium on Applied Plasma Science, Kyoto, Japan, Sept. 1-5, 2003, (chaired session on Environmental Applications of Plasmas).

Organizing Committee, 2004 Gordon Research Conference on Plasma Processing Science, (helped organize session on Atmospheric Pressure Glow Discharges), held Aug. 16-20, 2004.
Executive Committee, 2005 The 5th International Symposium on Applied Plasma Science, Hilo, Hawaii, Sept. 26-30, 2005
Editorial Board, 2005, *Advances in Applied Plasma Science*, Vol. 5, publication of the Institute of Applied Plasma Science.
Local Organizing Committee, *Gaseous Electronics Conference*, Dallas, Texas, Oct. 2008
Organizing Committee, *Gaseous Electronics Conference*, Saratoga Springs, New York, 20-23 Oct. 2009
Organizing Committee, *Advances in the Kinetic Description of Low-Temperature Plasmas: Applications to Modeling and Simulation*, Saratoga Springs, New York, 19 Oct 2009
Session Organizer and Chair for Plasma Thrusters session, International Conference on Plasma Science (ICOPS), Norfolk VA, June 2010.
Secretary-Elect, 65th Gaseous Electronics Conference, American Physical Society, Austin, Texas, Oct 2012.
Session Chair, 6th International Workshop on Microplasmas, Paris, France, 04-08 April 2011, (session on Plasma Microjets).
Member, AIAA-Plasma Dynamics and Lasers Technical Committee (since 2009).
Session Chair, 64th Gaseous Electronics Conference, Salt Lake City, Utah, Nov. 15-18, 2011, (session on Plasma Jets and Thermal Plasmas).
Secretary, 65th Gaseous Electronics Conference, American Physical Society, Austin, Texas, Oct 2012 (leading conference in non-equilibrium plasmas with attendance of about 400 national and international participants).
Executive Committee, Gaseous Electronics Conference, American Physical Society, 2010-2013.
Technical Program Chair, Plasma Dynamics and Lasers Conference, AIAA Science and Technology Forum and Exposition (AIAA SciTech 2014), held in National Harbor, Maryland, January 13-17, 2014.
Steering Committee, 2015 Aerospace Thematic Workshop (ATW) on "Fundamentals of Aerodynamic-Flow and Combustion Control by Plasmas," 12-17the April 2015, Les Houches, French Alps.
Guest Editor, Special issue on "Recent advances in the modeling and computer simulations of non-equilibrium plasma discharges," Journal of Physics D: Applied Physics 51 (2018).
Plasma Modeling PRO Chair, DoE-Fusion Energy Sciences Workshop on Plasma Science for Microelectronics Nanofabrication, Gaithersburg, MD, Aug. 8-9, 2022.
Committee Member (one of five members), Midterm Review for Princeton Collaborative Research Facility (PCRF) and Sandia National Laboratory Plasma Research Facility (PRF), Nov 28-29th, 2022.
Committee Member, Sandia National Laboratory Plasma Research Facility (PRF) Reviews, Jan 24th, 2024.
Invited subject-matter expert and representative for US Reactor Modeling/Simulation Community, Workshop on Human-Machine Collaboration (HMC), DARPA Microsystem Technology Office (MTO), Denver CO, Mar 5-7th 2024 (Breakout Session Lead, Report to DARPA)

OTHER PROFESSIONAL HIGHLIGHTS

Paper Reviews:
Catalysis Today
AIChE Journal
IEEE Transactions on Plasma Science
Comm. in Num. Methods in Engineering
Plasma Sources Science and Technology
Physics of Fluids
J. of Computational Physics
AIAA J. of Propulsion and Power
Experiments in Fluids
AIAA J.
J. of Physics D: Applied Physics
J. of Vacuum Science and Technology

Proposal Reviews:
National Science Foundation, Career Panel
American Chemical Society, Petroleum Research Fund

National Science Foundation, Panel Review, CCLI Program
National Science Foundation, Applied Math & Comp. Math Program
National Science Foundation, CTS Division
Department of Energy, Plasma Physics Jr. Fac. Program
Department of Energy/NSF, Partnership in Plasma Science
Department of Energy
The Kentucky Science and Engineering Foundation's R&D Excellence Program
National Science Foundation, Panel Review

UNIVERSITY COMMITTEES/ADMINISTRATIVE ASSIGNMENTS

University

Office of Vice President, UT-Austin, Research Grant Proposal
Limited Submission proposal review for the Office of the VP for Research, Scholarship, and Creative Endeavors, Dec 2022.
Invited Technical Expert: *The Success Committee* for a company applying for admission to *Austin Technology Incubator (ATI)*, Jan 2025.

Cockrell School of Engineering

Member, ASE UG Curriculum Committee, 2006-07
Academic Support Committee, 2008-2009.
Deans Promotion and Tenure Committee, 2019-2021
Faculty Judge, GAIN UT 2024
Faculty Judge, Energy Week, UT Energy Institute, Apr 2025.

Department

Member, Undergraduate Program Evaluation and Improvement Committee, 2002-05
Member, Fluids Ph. D. Qualifying Exam Committee, 2002-present
Member, Aerothermodynamics Ph. D. Qualifying Exam Committee, 2005-present
Member, ASE Graduate Studies Committee, 2002-05
Curriculum Committee ASE/EM 2005-06
Degrees and Courses Committee CSE 2006-07
Sigma Gamma Tau Advisor ASE/EM 2006-07
Sigma Gamma Tau Advisor ASE/EM 2007-08
Curriculum Committee ASE/EM 2008-09
Staff Awards Committee ASE/EM 2009-10
Staff Awards Committee ASE/EM 2010-11
Staff Awards Committee ASE/EM 2011-12
Chair, Asst. Prof. Three-Year Review Committee, 2014.
Fluids Area Coordinator, 2014 – 2018
Member, Post-Tenure Review Committee, 2012-2013, 2020
Chair, Asst. Prof. (Bisetti) BC Promotion Review Committee. 2021
Member, Curriculum Committee, 2022-24
Chair, Prof. (Goldstein) Comprehensive Post-tenure Review Committee. Fall 2023
Chair, Asst. Prof. (Underwood) 3-year review, Spring 2024
Chair, Department Strategic Planning Committee, Fall 2024

HONORS AND AWARDS:

Alpha Nu Sigma, National Honor Society in Nuclear Science and Engineering, 1992
Tau Beta Phi, National Engineering Honor Society, 1994
CAREER Award, National Science Foundation, Washington, DC, 2001
Dean's Fellow, College of Engineering, UT-Austin, Spring 2006.
Robert and Francis Stark Centennial Fellowship in Engineering, Sept. 2007 to Aug 2014.
Secretary, 65th Gaseous Electronics Conference, American Physical Society, Austin, Texas, Oct 2012 (leading conference in non-equilibrium plasmas with attendance of about 400 national and international participants).

Executive Committee, Gaseous Electronics Conference, 2010-2013.
Robert L. Parker Sr. Centennial Professorship in Engineering, Sept. 2014 - present.
Department Fellow, UT-Austin, Year Jan 2019 – Aug 2019.
Associate Fellow, AIAA (American Institute of Aeronautics and Astronautics) Elected Class of 2021.
Moncrief Grand Challenge Faculty Award, Oden Institute, UT-Austin, FY 2021.
L. B. (Preach) Meaders Professorship, Cockrell School of Engineering, UT-Austin, Sep. 2025 - present.

PUBLICATIONS:

Refereed Journal Publications (>160 journal papers total)

1. L.L. Raja, A. K. Sreekanth, S. Santhakumar, "Internal gas dynamics analysis of a compressed gas launcher," *Journal of Aeronautical Society of India* 42, 305 (1990). [4 pages]
2. Y.A. Hassan and L.L. Raja, "Simulation of Loss of RHR During Midloop Operations and the Role of Steam Generators in Decay Heat Removal Using the RELAP5/MOD3 code," *Nuclear Technology* 103, 310 (1993). [10 pages]
3. Y.A. Hassan and L.L. Raja, "Analysis of Experiments for Steam Condensation in the Presence of Noncondensable Gases Using the RELAP5/MOD3 Code," *Nuclear Technology* 104, 76 (1993). [13 pages]
4. L.L. Raja, P.L. Varghese, and D.E. Wilson, "Modeling of the Electrothermal Ignitor Metal Vapor Plasma for Electrothermal-Chemical Guns," *IEEE Transactions on Magnetics* 33, 316 (1997). [6 pages]
5. L.L. Raja, P.L. Varghese, and D.E. Wilson, "Modeling of the Electrogun Metal Vapor Plasma Discharge," *AIAA Journal of Thermophysics and Heat Transfer* 11, 353 (1997). [8 pages]
6. D.E. Wilson, K. Kim, and L.L. Raja, "Theoretical Analysis of an External Pulsed Plasma Jet," *IEEE Transactions on Magnetics* 35, 228 (1999). [10 pages]
7. L.L. Raja, R.J. Kee, and L.R. Petzold, "Simulation of Transient, Compressible, Gas-Dynamic, Behavior of Catalytic-Combustion Ignition in Stagnation Flows," *Proceedings of the Combustion Institute* 27, 2249 (1998). [6 pages] (formerly titled *Twenty-Seventh Symposium (International) on Combustion*).
8. L.L. Raja, R.J. Kee, O. Deutschmann, J. Warnatz, and L.D. Schmidt, "A Critical Evaluation of Navier-Stokes, Boundary-Layer, and Plug-Flow Models of the Flow and chemistry in a Catalytic Combustion Monolith," *Catalysis Today* 59, 47 (2000). [14 pages]
9. H.G. Im, L.L. Raja, R.J. Kee, and L.R. Petzold, "A Numerical Study of Transient Ignition in a Counterflow Nonpremixed Methane-Air Flame Using Adaptive Time Integration," *Combustion Science and Technology* 158, 341 (2000). [24 pages]
10. L.L. Raja, R.J. Kee, R. Serban, and L.R. Petzold, "Computational Algorithm for Dynamic Optimization of Chemical Vapor Deposition Processes in Stagnation Flow Reactors," *Journal of the Electrochemical Society* 147, 2718 (2000). [9 pages]
11. R.J. Kee, W.-H. Yang, L.L. Raja, and C.A. Wolden, "The Influence of Pressure, Fluid Flow, and Chemistry on the Combustion-Based Oxidation of Silicon," *Proceedings of the Combustion Institute* 28, 1381 (2000). [8 pages]

In Rank as Assistant Professor

12. X. Yuan and L. L. Raja, "Role of Trace Impurities in Large-Volume Noble Gas Atmospheric-Pressure Glow Discharges," *Applied Physics Letters* 81, 814 (2002). [3 pages]
13. T. L. Vincent and L.L. Raja, "Approach for Control of High-Density Plasma Reactors Through Optimal Pulse Shaping," *Journal of Vacuum Science and Technology A* 20, 1722 (2002). [11 pages].
14. L. L. Raja and M. Linne, "Analytical Model for Ion Angular Distribution Functions at rf Biased Surfaces with Collisionless Plasma Sheaths," *Journal of Applied Physics* 92, 7032 (2002). [9 pages]
15. P. Kothnur, X. Yuan, and L. L. Raja, "Structure of Direct-Current Microdischarge Plasmas in Helium," *Applied Physics Letters* 82, 529 (2003). [3 pages]
16. X. Yuan and L. L. Raja, "Computational Study of Capacitively Coupled High-Pressure Glow Discharges in Helium," *IEEE Transactions on Plasma Science* 31, 495 (2003). [9 pages]
17. J. Shin and L. L. Raja, "Dynamics of Pulse Phenomena in Helium Dielectric-Barrier Atmospheric-Pressure Glow Discharges," *Journal of Applied Physics* 94, 7408 (2003). [8 pages]

18. T. L. Vincent and L. L. Raja, "Optimal Pulse Shaping for Plasma Processing," *IEEE Transactions on Control Systems Technology* 12, 75 (2004). [12 pages]
19. G. Chen and L. L. Raja, "Fluid Modeling of Electron Heating in Low-Pressure, High-Frequency Capacitively Coupled Plasma Discharges," *Journal of Applied Physics* 96, 6073 (2004). [9 pages]
20. P. S. Kothnur and L. L. Raja, "Two-Dimensional Simulation of a Direct-Current Microhollow Cathode Discharge," *Journal of Applied Physics* 97, 043305 (2005). [12 pages]
21. P. S. Kothnur, J. Shin, and L. L. Raja, "Experimental and Numerical Study of External Plume Characteristics in Microhollow Cathode Discharges," *IEEE Transactions on Plasma Science* 23, 546 (2005). [2 pages] (4th Triennial Special Issue on Images in Plasma Science).

In Rank as Associate Professor

22. J. Shin and L. L. Raja, "Microdischarge-assisted ignition of dielectric-barrier high-pressure glow discharges," *Applied Physics Letters* 88, 021502 (2006). [3 pages]
23. X. Yuan, J. Shin, and L. L. Raja, "One-dimensional simulations of multi pulse phenomena in dielectric-barrier atmospheric-pressure glow discharges," *Vacuum* 80, 1199 (2006). [7 pages]
24. G. Chen, A. V. Arefiev, R. D. Bengtson, B. N. Breizman, C. A. Lee, and L. L. Raja, "Resonant power absorption in helicon plasma sources," *Physics of Plasmas* 13, 123507 (2006). [11 pages]
25. P. S. Kothnur and L. L. Raja, "Simulation of Direct-Current Microdischarges for Application in Electro-Thermal Class of Small Satellite Propulsion Devices," *Contributions to Plasma Physics* 47, 9 (2007). [10 pages]
26. J. Shin and L. L. Raja, "Run-to-run variations, asymmetric pulses, and long time-scale transient phenomena in dielectric-barrier atmospheric pressure glow discharges," *Journal of Physics D: Applied Physics* 40, 3145 (2007). [10 pages]
27. J. Shin, V. Narayanaswamy, L. L. Raja, and N. T. Clemens, "Characterization of a Direct-Current Glow Discharge Plasma Actuator in Low-Pressure Supersonic Flow," *AIAA Journal* 45, 1596 (2007). [10 pages]
28. T. Deconinck, S. Mahadevan and L. L. Raja, "Simulation of Direct-Current Surface Plasma Discharge Phenomena in High-Speed Flow Actuation," *IEEE Transactions on Plasma Science* 35, 1301 (2007). [11 pages]
29. T. Deconinck, S. Mahadevan and L. L. Raja, "Simulation of a Direct-Current Microdischarge for the Micro Plasma Thrusters," *IEEE Transactions on Plasma Science* 36, 1200 (2008). [2 pages] (5th Triennial Special Issue on Images in Plasma Science).
30. J. Shin, N. T. Clemens, and L. L. Raja, "Schlieren Imaging of Flow Actuation Produced by Direct-Current Surface Glow Discharge in Supersonic Flows,'' *IEEE Transactions on Plasma Science* 36, 1316 (2008). [2 pages] (5th Triennial Special Issue on Images in Plasma Science).
31. D. F. Berisford, R. D. Bengtson, L. L. Raja, L. D. Cassady, and W. J. Chancery. "Heat flow diagnostics for helicon plasmas," *Review of Scientific Instruments* 79, 10F515 (2008). [3 pages]
32. T. Deconinck and L. L. Raja, "Modeling of Mode Transition Behavior in Argon Microhollow Cathode Discharges," *Plasma Processes and Polymers* 6, 335 (2009). [12 pages] (Invited paper)
33. T. Deconinck, S. Mahadevan, and L. L. Raja, "Discretization of the Joule heating term for plasma discharge fluid models in unstructured meshes," *Journal of Computational Physics* 228, 4435 (2009). [9 pages]
34. T. Deconinck, S. Mahadevan, and L. L. Raja, "Computational simulation of coupled nonequilibrium discharge and compressible flow phenomena in a microplasma thruster," *Journal of Applied Physics* 106, 063305 (2009). [13 pages]
35. V. Narayanaswamy, L. L. Raja, and N. T. Clemens, "Characterization of a High-Frequency Pulsed Plasma Jet Actuator," *AIAA Journal* 48, 297 (2010). [9 pages]
36. J. Shin and L. L. Raja, "Cathode-sheath driven low-speed aerodynamic flow actuation using direct-current surface glow discharges," *Journal of Electrostatics* 68, 453 (2010). [5 pages]
37. D. F. Berisford, R. D. Bengtson, and L. L. Raja, "Power balance and wall erosion measurements in a helicon plasma," *Physics of Plasmas* 17, 33503 (2010). [11 pages]
38. S. Mahadevan and L. L. Raja, "Simulations of direct-current air glow discharge at pressures ~ 1Torr: Discharge model validation," *Journal of Applied Physics* 107, 093304 (2010). [11 pages]
39. J. M. Albright, L. L. Raja, M. Manley, K. Ravi-Chandar, and S. Satapathy, "Studies of Asperity-Scale Plasma Discharge Phenomena," *IEEE Transactions on Plasma Science* 39, 1560 (2011). [6 pages]
40. H. Sitaraman and L. L. Raja, "Gas temperature effects in micrometer-scale dielectric barrier discharges," *Journal of Physics D: Applied Physics* 44, 265201 (2011). [11 pages]
41. H. Sitaraman and L. L. Raja, "Simulation of RF Microdischarges for Microthruster Applications," *IEEE Transactions on Plasma Science* 39, 2930 (2011). [2 pages] (Special Issue on Images in Plasma Science).

42. D. Breden and L. L. Raja, "Gas Heating Effects in a Pulse Nanosecond Streamer Discharge Interacting with a Supersonic O2-H2 Flow," *IEEE Transactions on Plasma Science* 39, 2250 (2011). [2 pages] (Special Issue on Images in Plasma Science).
43. S. Mahadevan and L. L. Raja, "Simulation of Direct-Current Surface Plasma Discharges in Air for Supersonic Flow Control," *AIAA Journal* 50, 325 (2012). [13 pages]
44. V. Narayanaswamy, N. T. Clemens, and L. L. Raja, "Method for acquiring pressure measurements in presence of plasma-induced interference for supersonic flow control applications," *Measurement Science and Technology* 22, 125107 (2011). [11 pages]
45. D. Breden and L. L. Raja, "Simulations of nanosecond pulsed plasmas in supersonic flows for combustion applications," *AIAA Journal* 50, 647 (2012). [12 pages]
46. V. Narayanaswamy, L. L. Raja, and N. T. Clemens, "Control of a shock/boundary-layer interaction by using a pulsed-plasma jet actuator,", Technical Note, *AIAA Journal* 50, 246 (2012). [4 pages]
47. D. Breden, K. Miki, and L. L. Raja, "Computational study of cold atmospheric nanosecond pulsed helium plasma jet in air," *Applied Physics Letters* 99, 111501 (2011). [3 pages]
48. V. Narayanaswamy, L. L. Raja, and N. T. Clemens*, "Control of Unsteadiness of a Shock Wave / Turbulent Boundary Layer Interaction by using a Pulsed-Plasma Jet Actuator," *Physics of Fluids* 24, 076101 (2012). [22 pages]
49. H. Sitaraman and L. L. Raja, "Simulations studies of RF excited Micro Cavity Discharges for micro-propulsion applications," *Journal of Physics D: Applied Physics* 45, 185201 (2012). [12 pages]
50. D. Breden, K. Miki, and L. L. Raja, "Self-consistent two-dimensional modeling of cold atmospheric-pressure plasma jets/bullets," *Plasma Sources Science and Technology* 21, 034011 (2012). [13 pages]

In Rank as Full Professor

51. L. L. Raja, S. Mahadevan, P. L. G. Ventzek, and J. Yoshikawa, "Computational modeling study of the radial line slot antenna microwave plasma source with comparison to experiments," *Journal of Vacuum Science and Technology A* 31, 031304 (2013). [11 pages]
52. D. Breden, L. L. Raja, C. A. Idicheria, P. M. Najt, and S. Mahadevan, "A numerical study of high-pressure non-equilibrium streamers for combustion ignition application," *Journal of Applied Physics* 114, 08302 (2013). [14 pages]
53. H. Sitaraman and L. L. Raja, "A matrix free implicit scheme for the resistive magneto-hydrodynamic equations on unstructured grids," *Journal of Computational Physics* 251, 364 (2013). [19 pages]
54. R. R. Upadhyay, I. Sawada, P. L. G. Ventzek, and L. L. Raja, "Effect of electromagnetic waves and higher harmonics in capacitively coupled plasma phenomena," *Journal of Physics D: Applied Physics* (Fast Track Communications) 46, 472001 (2013). [5 pages]
55. B. Pafford, J. Sirohi, and L. L. Raja, "Propagating-Arc Magnetohydrodynamic Plasma Actuator for Directional High-Authority Flow Control in Atmospheric Air," *Journal of Physics D: Applied Physics* 46, 4852208 (2013). [7 pages]
56. H. Sitaraman and L. L. Raja, "Magneto-hydrodynamics simulation study of deflagration mode in coaxial plasma accelerators," *Physics of Plasmas* 21, 012104 (2014). [12 pages]
57. M. V. Pachuilo, F. Stefani, L. L. Raja, R. D. Bengtson, G. A. Henkelman, A. C. Tas, W. M. Kriven, S. K Sinha, "Development of a Gas-fed Plasma Source for Pulsed High-density Plasma/Material Interaction Studies," *IEEE Transactions on Plasma Science* 42, 3245 (2014). [7 pages]
58. I. Sawada, P. L. G. Ventzek, B. Lane, T. Ohshita, R. R. Upadhyay and L. L. Raja, "Relationship between center-peaked plasma density profiles and harmonic electromagnetic waves in very high frequency capacitively coupled plasma reactors," *Japanese Journal of Applied Physics* 53, 03DB0 (2014). [6 pages]
59. D. Breden and L. L. Raja, "Computational study of the interaction of cold atmospheric helium plasma jets with surfaces," *Plasma Sources Science and Technology* 23, 065020 (2014). [15 pages]
60. D. Levko and L. L. Raja, "Breakdown of atmospheric pressure microgaps at high excitation frequencies," *Journal of Applied Physics* 117, 173303 (2015). [9 pages]
61. S. Kar, H. Kousaka, and L. L. Raja, "Spatio-temporal behavior of microwave sheath-voltage combination plasma source," *Journal of Applied Physics* 117, 183302 (2015). [7 pages]
62. D. Levko and L. L. Raja, "Effect of frequency on microplasmas driven by microwave excitation," *Journal of Applied Physics* 118, 043303 (2015). [6 pages]
63. D. Levko and L. L. Raja, "Dynamics of a wire-to-cylinder atmospheric pressure high-voltage nanosecond discharge," *Physics of Plasmas* 22, 083507 (2015). [6 pages]

64. Y.-J. Choi, J. Sirohi, L. L. Raja, "Measurement of transient force produced by a propagating are magnetohydrodynamic plasma actuator in quiescent atmospheric air" *Journal of Physics D: Applied Physics* 48, 425204 (2015). [11 pages]
65. M. Gray, Y.-J. Choi, J. Sirohi, and L. L. Raja, "Structure of Propagating Arc in a Magneto-Hydrodynamic Rail Plasma Actuator," *Journal of Physics D: Applied Physics* 49, 015202 (2015). [10 pages]
66. P. K. Panneer Chelvam and L. L. Raja, "Computational modeling of the effect of electron injection into a direct-current microdischarge," *Journal of Applied Physics* 118, 243301 (2015). [11 pages]
67. D. Levko and L. L. Raja, "Early stage time evolution of a dense nanosecond microdischarge used in fast optical switching applications," *Physics of Plasmas* 22, 123518 (2016). [7 pages]
68. D. Levko and L. L. Raja, "Influence of emitter temperature on the energy deposition in a low-pressure plasma," *Physics of Plasmas* 23, 032107 (2016). [8 pages]
69. D. Levko and L. L. Raja, "Response to "Comment on 'Early stage time evolution of a dense nanosecond microdischarge used in fast optical switching applications'" [Phys. Plasmas 23, 034705 (2016)]," *Physics of Plasmas* 23, 034706 (2016). [2 pages]
70. D. Levko and L. L. Raja "Particle-in-cell modeling of gas-confined barrier discharge, *Physics of Plasmas* 23, 043502 (2016). [6 pages]
71. D. Levko and L. L. Raja, "Influence of field emission on the propagation of cylindrical fast ionization wave in atmospheric-pressure nitrogen," *Journal of Applied Physics* 119, 153301 (2016). [7 pages]
72. D. Levko and L. L. Raja, "Influence of field emission on microwave microdischarges," *High Voltage* 1, 57 (2016). [3 pages]
73. D. Levko and L. L. Raja "Electron kinetics in atmospheric-pressure argon and nitrogen microwave microdischarge," *Journal of Applied Physics* 119, 163303 (2016). [10 pages]
74. D. Levko, A. Sharma, L. L. Raja, "Microwave plasmas generated in bubbles immersed in liquids for hydrocarbons reforming," *Journal of Physics D: Applied Physics* 49, 22LT01 (2016). [7 pages]
75. D. Levko, A. Sharma, L. L. Raja, "Plasmas generated in bubbles immersed in liquids: direct current streamers vs. microwave plasma," *Journal of Physics D: Applied Physics* 49, 285205 (2016) [10 pages].
76. D. Levko and L. L. Raja, "Fluid modeling of a high-voltage nanosecond pulsed xenon microdischarge," *Physics of Plasmas* 23, 073513 (2016) [5 pages].
77. P. Paneer Chelvam, L. L. Raja, and R. R. Upadhyay, "Computational modeling of a single microdischarge interactions with high frequency electromagnetic waves," *Journal of Physics D: Applied Physics* 49, 345501 (2016). [11 pages].
78. K. Kourtzanidis and L. L. Raja, "On the accuracy of the rate coefficients used in plasmas fluid models for breakdown in air," *Physics of Plasmas* 23, 074503 (2016). [4 pages]
79. K. Kourtzanidis, D. Pederson, and L. L. Raja, "Active electromagnetic energy flow control with a tunable and reconfigurable coupled plasma split-ring resonator metamaterial: Influence of basic conditions and configurations," *Journal of Applied Physics* 119, 204904 (2016). [10 pages]
80. A. Sharma, D. Levko, L. L. Raja, and M.-S. Cha, "Kinetics and dynamics of nanosecond streamer discharge in atmospheric-pressure gas bubbles suspended in distilled water under saturated vapor pressure conditions" *Journal of Physics D: Applied Physics* 49, 395205 (2016). [22 pages]
81. A. Sharma, D. Levko, and L. L. Raja, "Effect of oxygen impurities on atmospheric-pressure surface streamer discharge in argon for large gap breakdown," *Physics of Plasmas* 23, 103501 (2016). [11 pages]
82. D. Levko and L. L. Raja, "Effect of negative gases admixture on the stability of beam-driven discharges," *Plasma Sources Science and Technology* 25, 064003 (2016). [7 pages]
83. D. Levko, A. Sharma, and L. L. Raja, "Non-thermal plasma ethanol reforming in bubbles immersed in liquids," *Journal of Physics D: Applied Physics* 50, 085202 (2017). [15 pages]
84. D. Levko and L. L. Raja, "Fluid vs. global model approach for the modeling of active species production by streamer discharge," *Plasma Sources Science and Technology* 26, 035003 (2017). [16 pages]
85. D. Levko and L. L. Raja, "Magnetized direct current microdischarge I: Effect of the gas pressure," *Journal of Applied Physics* 121, 093302 (2017). [9 pages].
86. D. Levko and L. L. Raja, "Magnetized direct current microdischarge II: Effect of magnetic field amplitude on the plasma," *Journal of Applied Physics* 121, 093303 (2017). [6 pages]
87. K. Kourtzanidis and L. L. Raja, "Analysis and characterization of microwave plasma generated with rectangular all-dielectric resonators," *Plasma Sources Science and Technology* 26, 045007 (2017). [13 pages]
88. K. Kourtzanidis and L. L. Raja, "Three-electrode sliding nanosecond dielectric barrier discharge actuator: modeling and physics," *AIAA Journal* 55, 1393 (2017). [12 pages]
89. D. Levko and L. L. Raja, "Kinetic effects during the interaction between high density microplasma and electromagnetic wave," *Physics of Plasmas* 24, 043509 (2017). [7 pages]

90. V. Subramaniam and L. L. Raja, "Magnetohydrodynamic simulation study of plasma jets and plasma-surface contact in coaxial plasma accelerators," *Physics of Plasmas* 24, 062507 (2017). [12 pages]
91. M. V. Pachuilo, F. Stefani, R. D. Bengtson, D. Dipti, R. Srivastava, and L. L. Raja, "Dynamics of surface streamer plasmas at atmospheric pressure: Mixture of argon and methane, *IEEE Transactions on Plasma Science* 45, 1776 (2017). [12 pages]
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Technical Reports

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3. H.G. Im, L.L. Raja, R.J. Kee, A.E. Lutz, and L.R. Petzold, "OPUS: A Fortran Program for Unsteady Opposed-Flow Flames," Sandia Report SAND2000-8211, Sandia National Laboratories, Albuquerque, NM, 2000.

ORAL PRESENTATIONS: (* indicates presenter)

Invited Talks:

1. L.L. Raja, "Gas Flow Transport and Chemistry Issues in Catalytic Combustion," Department of Environmental Science and Engineering Seminar, Colorado School of Mines, Mar. 30, 2000.
2. L.L. Raja, "Gas Flow Transport and Chemistry Issues in Catalytic Combustion," Department of Chemical and Petroleum Engineering Seminar, Colorado School of Mines, Mar. 30, 2000.
3. L.L. Raja, "A Model-Based Approach for the Design, Optimization, and Control of Metal-Vapor Effusion Cells," Institute for Energy Conversion, Univ. of Delaware, July 7, 2000.
4. L.L. Raja, "Modeling of Coupled Plasma-Sheath-Bias Circuit Interaction Phenomena in High-Density Plasma Reactors," (Host Prof. David G. Goodwin) Mechanical Engineering Seminar, California Institute of Technology, Pasadena, CA, Mar. 9, 2001.
5. L.L. Raja, "SAHA: One-Dimensional Modeling of Semiconductor Plasma Process Reactors," Toshiba Corporate R&D Center, Toshiba Corporation, Kawasaki, Japan, Dec. 17, 2002.
6. L.L. Raja, "Modeling of High-Pressue, Non-Equilibrium Glow Discharge Phenomena," (Host Prof. Roger Bengston) Dept. of Physics, Fusion Research Center, The University of Texas at Austin, Austin, TX, Jan. 24, 2003.
7. L.L. Raja, "Computational and Experimental Studies of Helium Dielectric-Barrier Controlled Atmospheric-Pressure Glow Discharges," (Host Prof.dr.ir. M.C.M. van de Sanden) Dept. of Applied Physics, Technical University/Eindhoven, Eindhoven, The Netherlands, Mar. 13, 2003.
8. L.L. Raja, "The Dynamics of Large-Volume Atmospheric-Pressure Glow Discharges," (Center for Advanced Technology, Department of Atomic Energy, GOI, Indore, India, July 29, 2003.
9. (**Plenary Talk**) L.L. Raja, "The Dynamics and Chemistry of Large-Volume Atmospheric-Pressure Glow Discharges," (Hosted by Prof. A. Kobayashi, Symposium chairman) 4th International Symposium on Applied Plasma Science, Kyoto, Japan, Sept. 1-5, 2003.
10. L.L. Raja, "Modeling of Low-Temperature Plasmas for Materials Processing and Space Propulsion Applications," ITN Energy Systems Inc., Morrison, CO, Nov. 10, 2004.
11. L. L. Raja, "Simulation of Direct-Current Microdischarges for Small-Satellite Micropropulsion Applications," Mechanical and Aerospace Engineering Department Colloquium, Cornell University, Ithaca, NY, Nov. 22, 2005.
12. (**Plenary Talk**) L. L. Raja, "Simulation of direct-current microdischarges for application in electro-thermal class of small satellite propulsion devices," 3rd International Workshop on Microplasmas, Griefswald, Germany, May 9-11, 2006.
13. L. L. Raja, "Physics of microdischarges and their applications in aerospace engineering," Gordon Research Conference on Plasma Processing Science, Mount Holyoke College, South Hadley, MA, July 16-21, 2006.
14. L.L. Raja*, "Studies of direct-current surface glow discharge actuator for high-speed glow control," Dept of Physics, The University of Texas at Austin, Feb 08, 2008.
15. L.L. Raja, "Studies of direct-current surface glow discharge actuator for high-speed glow control," Dept of Electrical and Computer Engineering, Old Dominion University, Norfolk, VA, April 04, 2008.
16. L. L. Raja, "Data needs for modeling non-equilibrium plasma discharges using the continuum (fluid) approach," Pre-conference Workshop: Advances in the Kinetic Description of Low-Temperature Plasmas: Applications to Modeling and Simulation, Saratoga Springs, New York, 19 Oct 2009.
17. L. L. Raja, "Microdischarge plasma thrusters for small satellite propulsion," Gaseous Electronics Conference, Saratoga Springs, NY, 20-23 Oct. 2009.
18. L. L. Raja, "Computational modeling of DC and pulsed microplasma-based space propulsion devices," AVS 57th International Symposium and Exhibition, Albuquerque, NM, USA, Oct 17-22, 2010.
19. V. Narayanaswamy*, N. T. Clemens, and L. L. Raja, "Application of pulsed-plasma jet actuators for shock/boundary layer interaction control," 49th AIAA Aerospace Sciences Meeting, Orlando, Florida, Jan 4-7th, 2011.
20. L. L. Raja, "Modeling and simulation of microdischarge based micropropulsion devices," 6th International Workshop on Microplasmas, Paris, France, Apr. 04-08, 2011.

21. L. L. Raja, "Modeling of nanosecond pulsed discharges in supersonic flow for combustion applications," LAboratoire PLAsma et Conversion d'Energie (LAPLACE), Université Paul Sabatier, Toulouse, France, April 8th, 2011. (Host: Dr. L. Pitchford).
22. L. L. Raja, "Status and Challenges for Modeling and Simulations of Plasma Actuators for Aerodynamic Flow Control," AIAA Plasmadynamics and Lasers Conference, New Orleans, 25th June 2012.
23. L. L. Raja*, "Physics and Chemistry of cold plasma discharges for automotive ignition applications," General Motors Corporate R&D Center, Warren, Michigan, Dec 4th 2012.
24. L. L. Raja, "Computational modeling of cold plasma discharges for plasma-assisted combustion applications", 4th Aerospace Thematic Workshop on Fundamentals of Aerodynamic Flow and Combustion Control by Plasmas, Aussios, France, 7th-11th April 2013.
25. L. L. Raja, "Computational modeling of cold plasma discharges for plasma-assisted combustion applications", Clean Combustion Research Center (CCRC) Seminar, King Abdullah University of Science and Technology (KAUST), Thuwal, Saudi Arabia, 3rd June 2013.
26. L. L. Raja, "High-fidelity computational modeling of non-equilibrium discharges for combustion ignition", AFOSR Plasma-Assisted Combustion MURI Review, Arlington, VA, 22-24th Oct. 2013.
27. L. L. Raja, "High-fidelity computational modelling of coupled plasma-electromagnetic wave interactions in process discharges," Mechanical Engineering Dept., Nagoya University, Nagoya, Japan, 30th Jan 2014.
28. L. L. Raja, "High-fidelity computational modelling of coupled plasma-electromagnetic wave interactions in process discharges," Institute for Plasma Research, Dept. of Atomic Energy, India, 16th July 2014.
29. L. L. Raja, "Cold plasma ignition using dielectric-barrier discharges," General Motors Corporate R&D Center, Warren, Michigan, Nov 23th 2014.
30. L. L. Raja, "High-Fidelity Computational Modeling of Plasma-Assisted Fuel Reforming, CCF Review Meeting, King Abdullah University of Science and Technology (KAUST), Thuwal, Saudi Arabia, 23rd Mar 2015.
31. L. L. Raja, "Simulation of atmospheric pressure cold plasma jets and their interactions with surfaces," 8th International Workshop on Microplasmas, Newark, NJ, USA, 11-14th May 2015.
32. L. L. Raja, "Computational modeling and simulation of micron-scale discharges and their interactions with high-frequency electromagnetic waves", 68th Gaseous Electronics Conference, Honolulu, Hawaii, Oct. 12-16, 2015.
33. L. L. Raja, "Plasma Combustion Ignition (PCI) Modeling ToolKit for Automotive IC Ignition Studies" General Motors Corporate R&D Center, Warren, Michigan, Nov 23th 2015.
34. L. L. Raja, "Computational modeling of atmospheric cold plasma systems" Institute for Plasma Research, Gandhinagar, India, July 2016.
35. L. L. Raja, "Computational modeling of spark-plug phenomena for combustion ignition" General Electric Global Research Center, Bangalore, India, July 2016.
36. L. L. Raja "Multiscale computational modeling for plasma assisted ignition and combustion control", 6th EUCASS Aerospace Thematic Workshop Fundamental of Aerodynamic Flow and Combustion Control by Plasmas, St. Petersburg, Russia, April 10-14th 2017.
37. L. L. Raja, "Computational modeling of microplasma-EM wave interactions for plasma-based reconfigurable metamaterials and photonic crystals," Institute for Plasma Research, Gandhinagar, India, 21st June 2017.
38. L. L. Raja, "Selected Problems in Plasma Modeling: Liquid Processing and Spacecraft chargeup," Applied Materials Seminar Series, Austin, Texas, 25th July 2017.
39. L. L. Raja, "New Space: A launch vehicle / propulsion perspective," 4th Observer Research Foundation (ORF) Kalpana Chawla New Space Dialogue, New Delhi, India, 17th Feb 2018.
40. L. L. Raja, "Electric Propulsion; Historical development and status," Pearl Jubilee Event, Liquid Propulsion Systems Center, Indian Space Research Organization, Bangalore, India, 16th Apr 2018.
41. L. L. Raja, "Coupled plasma-electromagnetic wave simulations of reconfigurable metamaterials and photonic crystals," Metamaterials Workshop, Univ. of California, San Diego, 31st May 2018.
42. L. L. Raja, "Electric Propulsion; Historical development and status," Electric Propulsion Workshop, MS Ramiah Univ. of Applied Sciences, Bangalore, India, 6th July 2018.
43. L. L. Raja, "Keynote Address: Computer simulations for hypersonics," Symposium on Hypersonic Technologies, MS Ramiah Univ. of Applied Sciences, Bangalore, India, 20-21st Sept. 2019.
44. L. L. Raja, "Plasma effects in hypersonic flows and EM wave interactions," Symposium on Hypersonic Technologies, MS Ramiah Univ. of Applied Sciences, Bangalore, India, 20-21st Sept. 2019.
45. L. L. Raja, "Modeling and simulation of coupled plasma-flow interactions for aerodynamic flow actuation and sensing,"74th Gaseous Electronics Conference (American Physical Society), Virtual, 04th Oct 2021.
46. L. L. Raja, "High fidelity modeling of equipment scale processes in semiconductor manufacturing," LAM Research Corp. CTO's Seminar Series, Virtual, 26th Oct 2021.

47. L. L. Raja, "Multi-scale computational modeling for plasma assisted ignition and combustion control," Online Low-Temperature Plasma (OLTP) seminar series, Virtual, 1st Nov. 2022.
48. L. L. Raja, "High-performance computing in plasma reactor scale simulation: A review and prospects," GEC Workshop – Opportunities for Plasma Science and Engineering in Microelectronics Fabrication., Ann Arbor, MI (9th Oct 2023).
49. L. L. Raja, "High-Fidelity Modeling of Equipment Scale Processes in Semiconductor and Materials Processing," University of Texas, Dept. of Physics Seminar, 05th Dec. 2023.
50. L. L. Raja, "Multidimensional modeling of plasma-gas flow coupling with detailed chemical kinetics," Invited talk, Workshop on "Mechanisms of fast heating in nonequilibrium plasmas, AIAA SciTech 2024, Orlando, FL, 09th Jan 2024
51. L. L. Raja, "High-Fidelity Modeling of Reactive Plasma Discharges for Materials Processing Applications," DoE National Renewable Energy Laboratory (NREL), Golden, CO, 07th Mar. 2024.
52. L. L. Raja, "Digital Twins for Semiconductor Manufacturing Equipment," US-PTO delegate visit, Texas Institute of Electronics, UT-Austin, 18th July 2024.
53. J. Ganguli and L. L. Raja, "Digital thread and digital twin – gaps in theory, practice, implementation from a OEM, Vendor perspective," Ai-DT 2025 Advanced in Digital Twins Workshop, Stanford Univ., Palo Alto, CA, 24th-25th Feb 2025.

Contributed Talks:

54. L.L. Raja* and Y.A. Hassan, "Comparison of the RELAP5/MOD3 and RELAP5/MOD2 Predictions of the Winfrith Post Dryout Experiment," 1991 Annual Meeting, American Nuclear Society, Orlando, FL, June 1991.
55. L.L. Raja*, and Y.A. Hassan, "Simulation of a Single U-tube Condensation Experiment in the Presence of Noncondensable Gases," 1991 Winter Meeting, American Nuclear Society, San Francisco, CA, Nov. 1991.
56. L.L. Raja*, and Y.A. Hassan, "Prediction of the MIT Steam Condensation Experiment in the Presence of Air," 1991 Winter Meeting, American Nuclear Society, San Francisco, CA, Nov. 1991.
57. L.L. Raja*, and Y.A. Hassan, "Simulation of Loss of RHR During Midloop Operations and the Role of Steam Generators in Decay Heat Removal," 1992 Winter Annual Meeting, American Nuclear Society, Chicago, IL, Nov. 1992.
58. L.L. Raja*, P.L. Varghese, and D.E. Wilson, "Modeling of the Electrothermal Ignitor Metal Vapor Plasma for Electrothermal-Chemical Guns," 8th EML Symposium on Electromagnetic Launch Technology, Baltimore, MD, Apr. 21-24, 1996.
59. L.L. Raja*, P.L. Varghese, and D.E. Wilson, "Modeling of the electrogun metal vapor plasma discharge," AIAA Paper 96-2327, 27th Plasma dynamics and Lasers Conference, New Orleans, LA, June 17-20, 1996.
60. J.M. Kohel*, L.K. Su, L.L. Raja, N.T. Clemens, and P.L. Varghese, "Experimental Characterization of a Pulsed Plasma Jet," AIAA Paper 98-0999, 36th Aerospace Sciences Meeting & Exhibit, Reno, NV, Jan. 12-15, 1998.
61. L.L. Raja*, "Stagnation Flows in Advanced Materials Processing and Combustion," Thermal/Fluid Systems Seminar Series, Mechanical Engineering Department, The University of Texas at Austin, Austin, TX, Feb. 20, 1998.
62. L.L. Raja*, "Development and Application of Chemically Reacting Flow Models in the Design and Control of Materials Processes," Engineering Division, Colorado School of Mines, Golden, CO, April 20, 1998.
63. L.L. Raja*, "Reduced Flow Modeling and Chemistries for Atmospheric Pressure Chemical-Vapor Deposition of Cadmium-Telluride Thin Films," ITN/Energy Systems, Wheatridge, CO, May 4, 1998.
64. L.L. Raja*, "Simulation of the Transient, Compressible, Gas-Dynamic, Behavior of Catalytic-Combustion Ignition in Stagnation Flows," 27th International Symposium on Combustion, Boulder, CO, Aug. 6, 1998.
65. L.L. Raja*, "Reactor Scale Modeling for MOCVD of YBCO Superconducting Thin Films," Courant Institute of Mathematical Sciences, New York University, NY, Oct. 5, 1998.
66. L.L. Raja*, "Reactor Scale Modeling for the Prediction and Control of Chemical Vapor Deposition Processes," Engineering Division, Colorado School of Mines, Golden, CO, Mar. 23, 1999.
67. L.L. Raja*, R.J. Kee, O. Deutschmann, J. Warnatz, and L.D. Schmidt, "A Critical Comparison of Navier-Stokes, Boundary-Layer, and Plug-Flow Model for the Simulation of Flow and Chemistry in a Catalytic Combustion Honeycomb Channel," 4th International Workshop on Catalytic Combustion, San Diego, CA, April 1999.
68. L.L. Raja*, E.A. Repetto, M. Gallivan, M. Jabbour, K. Bhattacharya, D.G. Goodwin, M. Ortiz, and R.J. Kee, "A Computational Simulation to Couple Reactor-Scale Performance with Microscale Surface Morphology in CVD Processes," 195th Meeting of the Electrochemical Society, Seattle, WA, May 1999.

69. H.G. Im*, L.L. Raja, and R.J. Kee, "A Numerical Study of Transient Ignition in Opposed Jet Flow Using Adaptive Time Integration," 17th International Colloquium on the Dynamics of Explosive and Reactive Systems, Heidelberg, Germany, July 25-30, 1999.
70. L.L. Raja*, "Catalytic Combustion Effort at the Center for Commercialization of Combustion in Space," CCACS Annual Meeting, Colorado School of Mines, Sept. 17, 1999.
71. D.G. Goodwin*, E.A. Repetto, B. Platt, M.A. Gallivan, M. Jabbour, K. Bhattacharya, M. Ortiz, L.L. Raja, and R.K. Kee, "A Modular Framework for Integrated Multiscale Modeling of Chemical Vapor Deposition," 2000 Spring Meeting, Materials Research Society, San Francisco, CA, April 24-28, 2000.
72. R.J. Kee*, L.L. Raja, and T.L. Vincent, "The Role of Computational Models in Designing Transient Optimal-Control Strategies for Thin Film Processing," 2000 Spring Meeting, Materials Research Society, San Francisco, CA, April 24-28, 2000.
73. A.B. Tripathi*, D.A. Boyd, M.A. Gallivan, H.A. Atwater, R.M. Murray, D.G. Goodwin, L.L. Raja, and R.J. Kee, "A Stagnation-Flow MOCVD Reactor for Intelligent Deposition of YBCO Thin Films, 15th International Symposium on Chemical Vapor Deposition, The Electrochemical Society, May 2000.
74. L.L. Raja*, "Multiscale Phenomena in High-Density Plasma Etching of VLSI and MEMS Microstructures," (interview talk) ASE/EM Seminar, University of Texas at Austin, Austin, TX, Sept. 10, 2001.
75. N. Sullivan*, L.L. Raja, R.J. Kee, Y. Yokota, and M. Williams, "Exploring the ISSG Parameter Space," 9th International Conference on Advanced Thermal Processing of Semiconductors (RTP 2001), Anchorage, AK, Sept. 25-29, 2001.
76. L.L. Raja* and E. Meeks, "A Fast Computational Model for Study of Coupled Bulk Plasma-Sheath-Bias Circuit Phenomena and its Effect on Plasma-Surface Interactions," 48th International Symposium, American Vacuum Society, San Francisco, CA, Oct. 28-Nov. 2, 2001.
77. T.L. Vincent* and L.L. Raja, "A Novel Approach for Control of High Density Plasma Process Parameters Through Optimal Pulse Shaping," 48th International Symposium, American Vacuum Society, San Francisco, CA, Oct. 28-Nov. 2, 2001.
78. X. Yuan* and L.L. Raja, "Modeling of Fundamental Processes in a Capacitively Coupled Helium Atmospheric-Pressure Glow Discharges, 48th International Symposium, American Vacuum Society, San Francisco, CA, Oct. 28-Nov. 2, 2001.
79. T. L. Vincent* and L.L. Raja, "Theory of Optimal Pulse Shaping for Plasma Processing," American Control Conference, Anchorage, AK, May 8-10, 2002.
80. P. Kothnur*, X. Yuan, L.L. Raja, "One-dimensional Simulation of Glow-Like Plasma Phenomena in Parallel-Plate Microdischarge Geometries," Gordon Research Conferences, Tilton School, NH, July 21-26, 2002.
81. P. Kothnur*, X. Yuan, and L.L. Raja, "One-Dimensional Simulation of Glow-Like Plasma Phenomena in Parallel-Plate Microdischarge Geometries," 49th International Symposium, American Vacuum Society, Denver, CO, Nov. 3-8, 2002.
82. X. Yuan*, and L.L. Raja, "Simulation of the Plasma Dynamics and Chemical Phenomena in Dielectric-Barrier Controlled Atmospheric-Pressure Glow Discharge," 49th International Symposium, American Vacuum Society, Denver, CO, Nov. 3-8, 2002.
83. G. Chen* and L. L. Raja, "One-dimensional Fluid Simulations of Low-Pressure, High-Frequency, Capacitively Coupled Plasma Discharges," 56th Gaseous Electronics Conference, San Francisco, CA, Oct. 21, 2003.
84. J. Shin* and L. L. Raja, "Dynamics of Pulse Phenomena in Helium Dielectric-Barrier Atmospheric Pressure Glow Discharges," 56th Gaseous Electronics Conference, San Francisco, CA, Oct. 21, 2003.
85. P. S. Kothnur* and L. L. Raja, "Two-Dimensional Simulation of the Structure of Direct-Current Microdischarges," 56th Gaseous Electronics Conference, San Francisco, CA, Oct. 21, 2003.
86. J. Shin*, P. L. Varghese, and L. L. Raja, "Transient Drift and Scatter Phenomena in Dielectric-Barrier Atmospheric Pressure Glow Discharge in Helium," 50th International Symposium, American Vacuum Society, Baltimore, MD, Nov. 5, 2003.
87. X. Yuan* and L. L. Raja, "Plasma Dynamics of Dielectric Barrier Controlled Atmospheric-Pressure Glow Discharge in Helium," 50th International Symposium, American Vacuum Society, Baltimore, MD, Nov. 5, 2003.
88. P. S. Kothnur* and L. L. Raja, "Two-Dimensional Simulation of the Structure of Direct-Current Microdischarges," 50th International Symposium, American Vacuum Society, Baltimore, MD, Nov. 5, 2003.
89. P. S. Kothnur* and L. L. Raja, "Two-Dimensional Simulation of the Structure of Direct-Current Microdischarges," 42nd AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, Jan. 5-8, 2004.
90. J. Shin* and L. L. Raja, "Long Time-Scale Characteristics of Dielectric Barrier Atmospheric-Pressure Glow Discharges," 57th Gaseous Electronics Conference, Bunratty, Ireland, Sept. 26, 2004.

91. P. Kothnur and L. L. Raja*, "Two-Dimensional Simulation of the Interaction Between Bulk Flow and Plasma Dynamics in Direct-Current Microdischarges," 57th Gaseous Electronics Conference, Bunratty, Ireland, Sept. 29, 2004.
92. G. Chen*, L. L. Raja, A. V. Arefiev, and B. N. Breizman, "Monte Carlo Simulation of Electron Kinetics in Helicon Plasma Source," VASIMR Workshop, Houston, TX, May 19, 2005.
93. J. Shin* and L. L. Raja, "Microdischarge-Assisted Ignition Characteristics of Large-Volume Atmospheric-Pressure Glow Discharges," 17th International Symposium on Plasma Chemistry, Toronto, Canada, Aug. 7-12, 2005.
94. P. Kothnur and L. L. Raja*, "Two-Dimensional Simulations of Interactions Between Bulk Flow and Plasma Dynamics in Direct-Current Microdischarges," 17th International Symposium on Plasma Chemistry, Toronto, Canada, Aug. 7-12, 2005.
95. J. Shin* and L. L. Raja, "Microdischarge-Assisted Ignition of Large Volume Dielectric Barrier Atmospheric-Pressure Glow (DB-APG) Discharges," 58th Gaseous Electronics Conference, San Jose, California, Oct. 16-20, 2005.
96. P. S. Kothnur and L. L. Raja*, "Simulation of Microdischarge Gas Heating in Electro-Thermal Class of Small Satellite Propulsion Devices," 58th Gaseous Electronics Conference, San Jose, California, Oct. 16-20, 2005.
97. G. Chen*, L. L. Raja, A Arefiev, B. Breizman, "Electron Kinetics in Helicon Discharges," 58th Gaseous Electronics Conference, San Jose, California, Oct. 16-20, 2005.
98. T. Deconinck*, S. Mahadevan, L. L. Raja, "Simulations of Glow Discharge Phenomena for High-Speed Flow Control," 58th Gaseous Electronics Conference, San Jose, California, Oct. 16-20, 2005.
99. J. Shin*, V. Narayanaswamy, L. L. Raja, and N. T. Clemens, "Study of a DC discharge for a Mach 3 supersonic flow actuation" Gordon Research Conference on Plasma Processing Science, Mount Holyoke College, South Hadley, MA, July 16-21, 2006.
100. G. Chen*, A. Arefiev, B. Breizman, C. Lee, L. L. Raja, R. Bengtson, "Radially localized helicon mode in helicon plasma sources," 59th Gaseous Electronics Conference, Colombus, Ohio, Oct. 11, 2006.
101. S. Yeldell, L. L. Raja*, and P. L. Varghese, "Experimental Studies of a Direct-Current Microdischarge Plasma Thruster," 59th Gaseous Electronics Conference, Colombus, Ohio, Oct. 11, 2006.
102. J. Shin*, V. Narayanaswamy, L. L. Raja, and N. T. Clemens, "Experimental and spectroscopic study of flow actuation phenomena using DC discharge at a Mach 3 flow," 59th Gaseous Electronics Conference, Colombus, Ohio, Oct. 10, 2006.
103. T. Deconinck*, S. Mahadevan, and L. L. Raja, "Simulations of nitrogen glow discharge phenomena for high-speed flow control," 59th Gaseous Electronics Conference, Colombus, Ohio, Oct. 10, 2006.
104. L. L. Raja*, "Direct-current surface discharges for plasma flow actuation at high-speeds," Plasma Simulation Workshop, US Air Force Academy, Colorado Springs, Colorado, Nov. 8, 2006.
105. V. Narayanaswamy*, J. Shin, L. L. Raja, and N. Clemens, "Characterization of supersonic flow boundary layer in the presence of a DC glow plasma discharge actuator," 59th Meeting of the American Physical Society, Division of Fluid Dynamics, Tampa, Nov. 19-21, 2006.
106. J. Shin, V. Narayanaswamy, T. Deconinck, S. Mahadevan, N. T. Clemens and L. L. Raja*, "Experimental and modeling studies of direct-current glow discharge phenomena using pin-like electrodes for high-speed aerodynamic flow actuation," 2007 Aerospace Thematic Workshop, Lake Como, Italy, May 27-June 1, 2007.
107. S. Mahadevan*, and L. L. Raja, "Simulations of direct-current air glow discharge phenomena," 60th Gaseous Electronics Conference, Arlington, VA, Oct. 3-7, 2007.
108. J. Shin*, N. T. Clemens, and L. L. Raja, "Experimental study of plasma induced flow actuation by direct-current discharge," 60th Gaseous Electronics Conference, Arlington, VA, Oct. 3-7, 2007.
109. T. Deconinck* and L. L. Raja, "Simulation studies of direct-current microdischarges for electrostatic mode microelectric propulsion," 60th Gaseous Electronics Conference, Arlington, VA, Oct. 3-7, 2007.
110. K.C. Utsav*, J. Bingaman, P. L. Varghese, and L. L. Raja, "Experimental studies of a microdischarge plasma thruster in a tri-electrode configuration," 60th Gaseous Electronics Conference, Arlington, VA, Oct. 3-7, 2007.
111. K. C. Utsav, P. L. Varghese, and L. L. Raja*, "Experimental Studies of a Microdischarge Plasma Thruster in a Tri-electrode Configuration," 4th International Workshop on Microplasmas, Tainan, Taiwan, Oct. 29, 2007.
112. T. Deconinck* and L. L. Raja, "Modeling of mode transition behavior in argon microhollow cathode discharges," Gordon Research Conference on Plasma Processing Science, Mount Holyoke College, South Hadley, MA, July 13-18, 2008.
113. T. Deconinck* and L. L. Raja, "Modeling of mode transition behavior in argon microhollow cathode discharges," 61st Gaseous Electronics Conference, Dallas, TX, Oct. 14-17, 2008.
114. S. Mahadevan* and L. L. Raja, "Simulations of direct-current glow discharges in supersonic air flow," 61st Gaseous Electronics Conference, Dallas, TX, Oct. 14-17, 2008.

115. S. Mahadevan* and L. L. Raja, "Simulation of direct-current air glow discharges for supersonic flow control," 62nd Gaseous Electronics Conference, Saratoga Springs, NY, Oct 20-23, 2009.
116. D. Breden* and L. L. Raja, "Simulations of Thermal Phenomena in Nanosecond Pulsed Plasma Discharged in Supersonic Flows," Gaseous Electronics Conference, Saratoga Springs, NY, Oct. 20-23, 2009.
117. J. M. Albright*, L. L. Raja, M. Manley, K. Ravi-Chandar, and S. Satapathy, "Studies of asperity-scale plasma discharge phenomena," 15th International Symposium on Electromagnetic Launch Technology (EML), Brussels, Belgium, May 17-20, 2010.
118. H. Sitaraman* and L. L. Raja, "Simulation studies of micrometer scale dielectric barrier discharges for microthruster applications," 37th IEEE International Conference on Plasma Science, Norfolk, VA, USA, June 20-24, 2010.
119. D. Breden* and L. L. Raja, "Modeling of Streamer Discharges in Supersonic Flows for Combustion Applications," 63rd Gaseous Electronics Conference, Paris, France, Oct. 5-8, 2010.
120. H Sitaraman* and L. L. Raja, "Simulation studies of Micro Cavity Discharges for Microthruster Applications," 63rd Gaseous Electronics Conference, Paris, France, Oct. 5-8, 2010.
121. J. M. Albright, L. L. Raja*, M. Manley, K. Ravi-Chandar, and S. Satapathy, "Studies of asperity-scale plasma discharge phenomena," 63rd Gaseous Electronics Conference, Paris, France, Oct. 5-8, 2010.
122. S. Mahadevan* and L. L. Raja, "Three dimensional simulations of surface air plasma discharge phenomena," 63rd Gaseous Electronics Conference, Paris, France, Oct. 5-8, 2010.
123. D. Breden*, K. Miki, and L. L. Raja, "Modeling of an atmospheric pressure helium plasma jet," 64th Gaseous Electronics Conference, Salt Lake City, Utah, Nov. 15-18, 2011.
124. H. Sitaraman* and L. L. Raja, "Magneto-hydrodynamics simulations of high density plasma in electromagnetic guns," 63rd Gaseous Electronics Conference, Salt Lake City, Utah, Oct. 15-18, 2011.
125. P. L. G. Ventzek*, S. Mahadevan, L. L. Raja, "Modeling of the radial line slot antenna plasma source for semiconductor manufacturing," AVS 58th International Symposium and Exhibition, American Vacuum Society, Nashville, Tennessee, Oct. 31st-Nov. 4th 2011. (Poster)
126. D. Breden* and L. L. Raja, "Simulation of an atmospheric pressure plasma jet in stagnation flow," 65th Gaseous Electronics Conference, Austin, TX, Oct. 23-26, 2012.
127. H. Sitaraman* and L. L. Raja, "Numerical modeling of deflagration mode in coaxial plasma guns," 65th Gaseous Electronics Conference, Austin, TX, Oct. 23-26, 2012.
128. D. Urrabazzo*, C. Liu, L. Overzet, L. L. Raja, D. Breden, H. Sitaraman, and P. K. Paneerchelvam, "Active control of the secondary electron emission coefficient: A new plasma control paradigm ?," 65th Gaseous Electronics Conference, Austin, TX, Oct. 23-26, 2012. (Poster)
129. R. Upadhyay*, S. Mahadevan, I. Sawada, M. Vukovic, P. L. G. Ventzek, and L. L. Raja, "The effect of frequency-dependent electron swarm parameters on fluid modeling of high-frequency CCP discharges," 65th Gaseous Electronics Conference, Austin, TX, Oct. 23-26, 2012.
130. M. Pachuilo*, F. Stefani, R. Bengtson, and L. L. Raja, "Development of a high-power non-ablative capillary discharge source for plasma-materials interactions studies," 65th Gaseous Electronics Conference, Austin, TX, Oct. 23-26, 2012. (Poster)
131. M. Pachulio et al. "Fast-imaging and spectroscopic analysis of atmospheric argon streamers for large gap arc breakdown", AIAA SciTech Meeting, National Harbor, MD, Jan 2-7th 2014.
132. V. Subramaniam and L. L. Raja, "Modeling of a coaxial-plasma gun for high-energy plasma-material interactions studies", DoE-NNSA Annual Review Meeting, Santa Fe, NM, March 2014.
133. M. Gray, Y.-J. Choi, J. Sirohi, L. L. Raja, "Experimental Study of RailPAc Plasma Actuator for High-Authority Aerodynamic Flow Control in One Atmosphere", 67th Gaseous Electronics Conference, Rayleigh, NC, Nov. 2-7, 2014.
134. V. Subramaniam, L. L. Raja, H. Sitaraman, "Magneto-hydrodynamic simulation of hypervelocity neutral plasma jets and their interactions with materials generating extreme conditions", 67th Gaseous Electronics Conference, Rayleigh, NC, Nov. 2-7, 2014.
135. P. Paneerchelvam and L. L. Raja, "Computational modelling of plasma control using electron injection from electrode surfaces", 67th Gaseous Electronics Conference, Rayleigh, NC, Nov. 2-t, 2014.
136. A. Sharma, L. L. Raja, "Numerical Investigations of Positive Surface Streamer Discharges For High-Pressure Large Gap Arc Breakdown", 67th Gaseous Electronics Conference, Rayleigh, NC, Nov. 2-7, 2014.
137. M. Paculio, F. Stefani, R. Bengton, L. L. Raja, "Fast-imaging and spectroscopic analysis of atmospheric argon streamers for large gap arc breakdown", 67th Gaseous Electronics Conference, Rayleigh, NC, Nov. 2-7, 2014.
138. S. Mahadevan, D. Breden, L. L. Raja, "Development, Verification and Validation of VizArc: a General-Purpose Thermal Plasma Simulation Tool", 67th Gaseous Electronics Conference, Rayleigh, NC, Nov. 2-7, 2014.

139. R. Upadhyay and L. L. Raja, "Self-consistent simulation of a microwave coaxial plasma waveguide", 67th Gaseous Electronics Conference, Rayleigh, NC, Nov. 2-7, 2014.
140. P. Paneerchelvam and L. L. Raja, "Computational modeling of electron injection in an argon microdischarge with DC source", International Workshop on Microplasmas, Seton Hall Univ., Newark, NJ, May 2015
141. K. Kourtzanidis, D. Pederson, and L. L. Raja, "Numerical modeling of plasma meta-materials for electromagnetic energy flow control", 68th Gaseous Electronics Conference, Honolulu, Hawaii, Oct. 12-16, 2015.
142. D. Pederson, K. Kourtzanidis, and L. L. Raja, "Numerical band structure calculations of plasma metamaterials", 68th Gaseous Electronics Conference, Honolulu, Hawaii, Oct. 12-16, 2015.
143. A. Sharma, D. Levko and L. L. Raja, "Methane reforming in a temperature-controlled DBD reactor", 68th Gaseous Electronics Conference, Honolulu, Hawaii, Oct. 12-16, 2015.
144. D. Levko and L. L. Raja, "Investigation of atmospheric pressure streamer discharges for methane reforming", 68th Gaseous Electronics Conference, Honolulu, Hawaii, Oct. 12-16, 2015.
145. V. Subramaniam and L. L. Raja, "MHD Simulations of Thermal Plasma Jets in Coaxial Plasma Accelerators", 68th Gaseous Electronics Conference, Honolulu, Hawaii, Oct. 12-16, 2015.
146. R. Upadhyay, T. Iwao, P. L. G. Ventzek, "Reactive radical production and transport analysis in ammonia-hydrogen-argon microwave plasmas", 68th Gaseous Electronics Conference, Honolulu, Hawaii, Oct. 12-16, 2015.
147. D. Breden, S. Mahadevan, and L. L. Raja, "Modeling of Thermal Arcs in Molded Case Circuit Breakers in Air", 68th Gaseous Electronics Conference, Honolulu, Hawaii, Oct. 12-16, 2015.
148. L. L. Raja, "Computational Modeling and Simulation of Micron-Scale Discharges and Their Interactions with High-Frequency Electromagnetic Waves", 68th Gaseous Electronics Conference, Honolulu, Hawaii, Oct. 12-16, 2015.
149. M. Gray, Y. Choi, J. Sirohi, and L. L. Raja, "Optimizations of the RailPAc Plasma Actuator for Atmospheric Aerodynamic Flow Control", 68th Gaseous Electronics Conference, Honolulu, Hawaii, Oct. 12-16, 2015.
150. P. Paneerchelvam and L. L. Raja, "Harmonic generation of microwave frequencies in plasmas", 68th Gaseous Electronics Conference, Honolulu, Hawaii, Oct. 12-16, 2015.
151. A. Sharma and L. L. Raja, "Chemical Kinetics Reduction of High Pressure Non-Equilibrium Plasma Discharges in Complex Gases Using Principal Component Analysis", 68th Gaseous Electronics Conference, Honolulu, Hawaii, Oct. 12-16, 2015.
152. D. Breden, S. Mahadevan, and L. L. Raja, "High-fidelity simulations of spark-plug plasma structure and dynamics in automotive internal combustion engines", SAE World Congress, Detroit, MI, April 13th 2016.
153. M. Pachuilo, D. Levko, and L. Raja, "Experimental Investigation of Pulsed Nanosecond Streamer Discharges for CO2 Reforming," 69th Gaseous Electronics Conference, Bochum, Germany, Oct. 10-14, 2016.
154. Y.-J. Choi, M. Gray, J. Sirohi, and L. L. Raja, "Measurement of Velocity Induced by a Propagating Arc Magnetohydrodynamic Plasma Actuator," 69th Gaseous Electronics Conference, Bochum, Germany, Oct. 10-14, 2016.
155. R. Upadhyay, T. Iwao, P. Ventzek, and L. Raja, "Fluid Modeling of a Very High Frequency Capacitively Coupled Reactor," 69th Gaseous Electronics Conference, Bochum, Germany, Oct. 10-14, 2016.
156. A. Sharma, D. Levko, and L. Raja, "Computational investigations of streamers in a single bubble suspended in distilled water under atmospheric pressure conditions," 69th Gaseous Electronics Conference, Bochum, Germany, Oct. 10-14, 2016.
157. K. Kourtzanidis, D. Pederson, and L. Raja, "Numerical modeling of high power breakdown in metamaterials, 69th Gaseous Electronics Conference, Bochum, Germany, Oct. 10-14, 2016.
158. M. Gray, Y.-J. Choi, J. Sirohi, and L. Raja, "Effects of Electrode Oxidation on the RailPAc Plasma Actuator Gliding Arc
159. A. Karpatne, D. Breden, and L. L. Raja, "Simulations of Spark-Plug Transient Plasma Breakdown in Automotive Internal Combustion Engines", SAE Technical Paper 2017-01-0563. Presented 2017 SAE World Congress, Detroit, MI, April 13th 2017.
160. K. Kourtzanidis and L. Raja, "High power electromagnetic filtering with plasma generation in rectangular Fabry-Perot type cut-resonators," 70th Gaseous Electronics Conference, Pittsburg, PA, Nov 6-10, 2017.
161. R. Upadhyay and L. Raja, "Computational Modeling of Microwave Interactions with Self-consistent Plasma," 70th Gaseous Electronics Conference, Pittsburg, PA, Nov 6-10, 2017.
162. A. Sharma and D. Levko, and L. Raja, "A Multiphase Computational Model for Non-Equilibrium Plasma Discharge in Gas Bubbles Immersed in Liquid," 70th Gaseous Electronics Conference, Pittsburg, PA, Nov 6-10, 2017.

163. V. Subramaniam and L. Raja, "Equilibrium plasma formation in coaxial plasma accelerators," 70th Gaseous Electronics Conference, Pittsburg, PA, Nov 6-10, 2017.
164. D. Levko and L. Raja, "Kinetic effects during the interaction between high density microplasma and electromagnetic wave," 70th Gaseous Electronics Conference, Pittsburg, PA, Nov 6-10, 2017.
165. D. Pederson, K. Kourtzanidis, and L. Raja, "Nonlinear Hydrodynamic Effects in Dense Microplasmas," 70th Gaseous Electronics Conference, Pittsburg, PA, Nov 6-10, 2017.
166. Y. Kim and L. Raja, "Numerical modeling of microwave driven surface discharge induced by resonantly exciting spoof surface plasmon polariton," 70th Gaseous Electronics Conference, Pittsburg, PA, Nov 6-10, 2017.
167. M. Gray and L. Raja, "Computational Study of RailPAc Arc-Root Jets," 70th Gaseous Electronics Conference, Pittsburg, PA, Nov 6-10, 2017.
168. V. Subramaniam and L. Raja, "Magnetohydrodynamic simulation study of plasma jets and plasma-surface interactions in coaxial plasma accelerators," 70th Gaseous Electronics Conference, Pittsburg, PA, Nov 6-10, 2017.
169. D. Levko and L. Raja, "Particle-in-Cell modeling of the magnetized direct current microdischarge," 70th Gaseous Electronics Conference, Pittsburg, PA, Nov 6-10, 2017.
170. D. Pederson, K. Kourtzanidis, and L. Raja, "Multiscale numerical modeling in plasma metamaterial systems," 70th Gaseous Electronics Conference, Pittsburg, PA, Nov 6-10, 2017.

2017 AIAA (4 presentations)
2018 SAE World Congress (3 presentations)

171. R. Upadhyay, P. Ventzek, L. Raja, A. Ranjan, "Computational modeling and simulation of a resonant plasma source," 71st Gaseous Electronics Conference, Portland, OR, Nov. 5-9, 2018.
172. A. Sharma, V. Subramaniam, E. Solmaz, and L. Raja, "Fully coupled plasma, flow, and combustion modeling of nanosecond pulsed discharge for combustion ignition," 71st Gaseous Electronics Conference, Portland, OR, Nov. 5-9, 2018.
173. Y. Kim and L. Raja, Modeling of surface plasma discharge induced spoof surface plasmon polariton in high pressure, 71st Gaseous Electronics Conference, Portland, OR, Nov. 5-9, 2018.
174. D. Pederson and L. Raja, "Modeling gas breakdown in high quality-factor resonators at GHz to THz frequencies, 71st Gaseous Electronics Conference, Portland, OR, Nov. 5-9, 2018.
175. P. Ventzek, Z. Chen, Y. Fukunaga, K. Suzuki, R. R. Upadhyay, L. L. Raja, M. Sekine, A. Ranjan, "Parametric modeling and measurements of pulsed source and biased plasmas, 71st Gaseous Electronics Conference, Portland, OR, Nov. 5-9, 2018.

2019 Winter AIAA-SciTech (3 presentation)
2019 SAE World Congress (Detroit) (2 presentation)
2019 SISPAD Conference (1 presentation)
2019 GEC (6 presentations)
2020 AIAA Scitech (3 presentations)
2020 GEC (4 presentations)
2021 GEC (6 presentations)
2021 AVS (2 presentations)
2022 AIAA SciTech (1 presentation)
2022 AIAA Aviation (2 presentations)
2023 AIAA Scitech (4 presentations)
2023 AIAA Aviation (2 presentations)
2023 GEC (6 presentations)
2024 GEC (4 presentations)

PATENTS/COPYRIGHTED SOFTWARE:

C. A. Idicheria, P. M. Najt, and L. L. Raja, Plasma Ignition Device, US Patent No. 9951743, 24th Apr. 2018.

RESEARCH TOPICS

1. Plasma arc modeling for carbon free industrial heat and industrial processing

2. Modeling of non-equilibrium plasmas in molecular gases
3. Modeling of electromagnetic waves interacting with very high-frequency discharges
4. Ionization of highly rarefied air flows for Very Low Earth Orbit (VLEO) spacecraft applications.
5. Reduced order modeling and uncertainty quantification in of plasma discharges

GRANTS AND CONTRACTS

(Note: "*PI*" – indicates Raja is Principal Investigator; "*Co-PI*" indicates Raja is co-Principal Investigator)

1. (*Co-PI*), "Modeling the Thermal and Gas Dynamic Behavior of High-Rate Evaporation Boats for Thin-Film Deposition Processes," with Prof. R. J. Kee (PI), and Prof. J. P. Delplanque; *Source:* Global Solar Energy, Tuscon, AZ, (DoD subcontract) *Duration:* 1/Jan/2000 – 31/Jan/2000.
2. (*Co-PI*), "A Feasibility Study of Plasma Sulfurization/Selenization for CIGS Photovoltaic Thin Films," with Prof. C. A. Wolden; *Source:* ITN Energy Systems (NIST-ATP Subcontract); *Duration:* 01/Mar/2000 – 28/Feb/2001.
3. (*PI*), "Development of Compact Plasma Models for Microelectronics Applications,"; *Source:* Toshiba Corporate R&D Center, Toshiba Semiconductor Company; *Duration:* 01/Mar/2000 – 31/May/2001.
4. (*Co-PI*), "Analysis of High-Rate Effusion Sources," with R. J. Kee, and J. P. Delplanque; *Source:* Global Solar Energy, Tuscon, AZ; *Duration:* 01/July/2000 – 31/Dec/2001.
5. (*Co-PI*), "Palm Power: Development of Compact Solid-Oxide Fuel Cells,"; *Source:* DARPA (sub-contract), collaboration between ITN Energy Systems, University of Virginia, Mesoscale Devices, Inc., Penn State University, and Colorado School of Mines; *Duration:* 15/Aug/2000 – 14/Aug/2001.
6. (*Co-PI*), "Modeling and Experimental Investigation of the ISSG Process," with R. J. Kee, C. A. Wolden, and T. J. McKinnon; *Source:* Applied Materials, Santa Clara, CA; *Duration:* 15/Aug/2000 – 14/Aug/2001.
7. (*Co-PI*), "Integrated Planar Solid-Oxide Fuel Cell Development,"; *Source:* NIST-ATP (sub-contract), collaboration between ITN Energy Systems, University of Colorado Boulder, INEEL Idaho, and Colorado School of Mines; *Duration:* 01/Sept/2000 – 31/Aug/2003.
8. (*PI*), "Development of a Comprehensive 1-Dimensional Model for Simulation of High-Density and Capacitively Coupled Plasma Reactors,"; *Source:* Toshiba Corporate R&D Center, Toshiba Semiconductor Company; *Duration:* 01/July/2001 – 31/Mar/2002.

The University of Texas at Austin

1. (*PI*), "Fundamental Investigations of Atmospheric-Pressure Glow Discharges,"; *Source:* National Science Foundation (CAREER Award), Contract Number: CTS 0221557; *Duration:* 01/Mar/2002 – 28/Feb/2006.
2. (*PI*), "Development of Novel Microdischarge-Assisted Atmospheric Pressure Glow Discharge,"; *Source:* Research Grant, The Office of the Vice President for Research, The University of Texas at Austin; *Duration:* 01/Dec/2002 – 31/Aug/2003.
3. (*PI*), "Computational Study of Novel Microdischarge Thrusters for Nanosatellite Propulsion,"; *Source:* 2003 Summer Research Grant (Faculty Development Program), The Office of the Vice President and Dean of Graduate Studies, The University of Texas at Austin; *Duration:* 01/June/2003 – 31/July/2003.
4. (*PI*), "Computational Investigations of Novel Microglow Discharges for Potential Nanosatellite Thruster Applications,"; *Source:* Air Force Office of Scientific Research (AFOSR), Contract Number: F46620-03-1-0073; *Duration:* 01/Feb/2003 – 30/Jan/2006.
5. (*Co-PI*), "Formation Autonomy Spacecraft with Thrust, Relnav, Attitude, and Crosslink (FASTRAC),"; *Source:* US Air Force/NASA; *Duration:* 01/Apr/2003 – 31/Mar/2005.
6. (*Co-PI*), "Experimental/Computational Studies of Combined-Cycle Propulsion: Physics and Transient Phenomena in Inlets and Scramjet Combustors,"; *Source:* Air Force Office of Scientific Research (AFOSR) Multidisciplinary University Research Initiative (MURI) program, Contract Number: FA 9550-04-1-0387; *Duration:* 01/June/2004 – 31/May/2009.
7. (*PI*), "SGER: Exploratory Studies of Atmospheric-Pressure Glow Plasma Processing of Bio-Degradable Polymer Particles," with Prof. K. Roy; *Source:* National Science Foundation (NSF), Contract Number: CTS 0511817; *Duration:* 01/Sept/2005 – 31/Aug/2006.
8. (*PI*), "Studies of Microdischarge Plasma Thrusters (MPT) for nanosatellite propulsion," with Prof. P.L. Varghese; *Source:* Air Force Office of Scientific Research, Contract Number: FA9550-06-1-0176; *Duration:* 01/Feb/2006 – 30/Nov/2008.

9. (*Co-PI*) "Studies of Helicon Discharge for VASIMR Thruster," with Prof. R. Bengtson (UT-Austin, Physics) and Dr. B. Breizman (UT-Austin, FRC/Physics); *Source:* Ad Astra Rocket Company; *Duration:* 01/Jan/2006 – 31/Dec/2006.
10. (*Co-PI*) "Studies of Helicon Discharge for VASIMR Thruster," with Prof. R. Bengtson (UT-Austin, Physics) and Dr. B. Breizman (UT-Austin, FRC/Physics); *Source:* Ad Astra Rocket Company; *Duration:* 01/Jan/2007-31/Dec/2007.
11. (*PI*) "Simulation Studies of Railgun Contact Gap Plasmas,"; *Source:* Institute of Advanced Technology, The University of Texas at Austin; Source: ONR-MURI subcontract; *Duration:* 01/Apr/2007 – 31/Aug/2009.
12. (*PI*) "Collaborative Research: A Diagnostic and Modeling Investigation of Pulsed PECVD,"; *Source:* National Science Foundation, Contract Number: CBET 0829003; *Duration:* 01/Aug/2008 – 30/July/2011.
13. (*PI*) "Computational Study of MicroCavity Plasma Thrusters,"; *Source:* Air Force Office of Scientific Research; *Duration:* 01/Mar/2009 – 30/Nov/2009.
14. (*PI*) "Participant support for 2008 Gaseous Electronics Conference,"; *Source:* Air Force Office of Scientific Research, Contract Number: FA 9550-08-1-0360; *Duration:* 01/Aug/2008 – 30/Nov/2008.
15. (*PI*) "Participant support for 2009 Gaseous Electronics Conference,"; *Source:* National Science Foundation, Contract Number: CBET 0946014*Duration:* 01/Sept/2009 – 30/Nov/2009.
16. (*PI*) "Simulation Studies of Railgun Contact Gap Plasmas,"; *Source:* Institute of Advanced Technology, The University of Texas at Austin, ONR-MURI subcontract; *Duration:* 01/Sept/2009 – 31/July/2010.
17. (*PI*) "Computational Study of Micro Cavity Plasma Thrusters,"; *Source:* Air Force Office of Scientific Research; *Duration:* 01/Dec/2009 – 30/Nov/2010.
18. (*PI*) "Fundamental study of interactions between pulsed high-density plasmas and materials for space propulsion," with Dr. F. Stefani (UT-Austin, IAT), Prof. R. Bengtson (UT-Austin, Physics), Prof. G. Henkelman (UT-Austin, Chemistry) and Prof. W. Kriven (UIUC, Material Science); *Source:* Air Force Office of Scientific Research; *Duration:* 07/15/2011 – 03/31/2016.
19. (*PI*) "Collaborative Research: Fundamental Studies of Plasma Control Using Surface Embedded Electronic Devices," *Source:* Dept. of Energy/National Science Foundation; *Duration:* 08/01/2012 – 07/31/2015.
20. (*PI*) "A novel Rail Plasma Actuator (RailPAc) for high-authority aerodynamic flow control at atmospheric pressures," with Prof. J. Sirohi; *Source:* Army Research Office (ARO); *Duration:* 08/23/2012 – 04/22/2013.
21. (*PI*) "Participant support for 2012 Gaseous Electronics Conference,"; *Source:* National Science Foundation, Contract Number: PHY-1245175; *Duration:* 01/Sept/2012 – 30/Nov/2012.
22. *(PI)* NASA Space Technology Research Fellowship to student Frans Ebersohn, *Duration*: 01/Sept/2012-31/Aug/2013.
23. (*PI*) "Ultra-high speed neutral plasma jets and their interactions with materials generating extreme conditions,"; *Source:* Dept. of Energy NNSA (subcontract from Stanford Univ. PI Prof. Mark Cappelli); *Duration:* 04/01/2013 – 03/31/2016.
24. (*PI*) "RailPAc: A rail electrode based plasma actuator for high-authority aerodynamic flow control," with Prof. J. Sirohi; *Source:* Army Research Office (ARO); *Duration:* 06/10/2014 – 09/06/2017.
25. (*PI*) "Computational modeling of plasma and electrically assisted combustion,"; *Source:* King Abdullah University of Science and Technology (KAUST); *Duration:* 07/01/2014 – 06/30/2020.
26. (Co-*PI*) "Plasma-Based Reconfigurable Photonic Crystals and Metamaterials," with Prof. M. Cappelli, Stanford Univ. (PI) and 4 other co-PIs; *Source:* Air Force Office of Scientific Research; *Duration:* 10/01/2014 – 09/30/2019.
27. NDSEG Fellowship (Dylan Pedersen) [Raja's effective share $ 240,000] *Duration:* 08/01/2016 – 07/30/2019.
28. (*PI*) "Ultra-high speed neutral plasma jets and their interactions with materials generating extreme conditions,"; *Source:* Dept. of Energy NNSA (subcontract from Stanford Univ. PI Prof. Mark Cappelli); *Duration:* 08/01/2016 – 07/31/2018.
29. *(PI)* "Collaborative research: Unraveling the physics associated with the production of extremely dense plasma states of microscale nanosecond-pulsed discharges," Dept. of Energy, *Duration:* 08/15/2019 – 08/15/2022.
30. *(PI)* "Development of high-fidelity multiscale model of thin film deposition in deep-hole structures of 3D memory devices," Samsung Electronics, *Duration:* 03/01/2019 – 02/30/2020.
31. *(Co-PI)* "Enabling the sustainable energy transition: economic recovery of rare earth elements," UT-Energy Institute, *Duration:* 04/2020 – 04/2022.
32. *(Co-PI)* "Exascale Predictive Simulation of Inductively Coupled Plasma torches," US Dept. of Energy, *Duration:* 09/2020 – 09/2025.
33. *(Co-PI)* "Novel surface velocity sensor," NASA SBIR Phase 1, *Duration: 05*/2020 – 11/2021.

34. *(PI)* "Magnetized high-frequency excited plasmas for rarefied air ionization in air-breathing electric propulsion," Air Force Office of Scientific Research, *Duration:* 06/2022 – 05/2024.
35. *(PI)* "Collaborative Research: Electromagnetic wave-plasma interactions in very-high frequency capacitively coupled plasma reactors," US Department of Energy, *Duration:* 08/2022 – 07/2025.
36. *(PI) "*High-fidelity computational studies of intermediate pressure capacitively coupled plasma discharges," US Department of Energy, *Duration*: 09/25/2023 – 09/24/2024.
37. *(PI) UT-Austin* "Fundamental studies of hydrogen arc plasmas for high-efficiency and carbon-free steelmaking," US Department of Energy ("Earthshot Program"), Duration: 11/2023 – 11/2026.
38. *(Co-PI)* "Air-breathing magneto-deflagration thruster for VLEO satellite propulsion," DARPA, Duration: 03/2024 – 02/2026.
39. *(Co-PI) "*Next-Generation Microelectronics Manufacturing," DARPA, Duration: 09/2024 – 09/2029.
40. *(PI)* "Computational modeling of pulsed plasma radio-frequency source in molecular gases," Air Force Office of Scientific Research, *Duration:* 10/2024 – 10/2027.

M.S. SUPERVISION COMPLETED:

1. Morrison, Brandon, "Direct Simulation Monte Carlo modeling of effusion source vapor plumes used in thin-film deposition processes" M.S. Thesis, Colorado School of Mines, June 2002.
2. Jichul Shin, "Experimental study of pulse-phenomena in helium dielectric-barrier atmospheric pressure glow discharge", MSE Thesis, The University of Texas at Austin, Dec. 2003.
3. Stephen Yeldell, "Experimental studies of a novel microdischarge plasma thruster" MSE Thesis, The University of Texas at Austin, Aug. 2006.
4. Shankar Mahadevan, "Simulation of supersonic flow phenomena in the presence of direct-current surface plasma actuators" MSE Thesis, The University of Texas at Austin, Dec. 2006.
5. Javan M. Albright, "Simulations of the Plasma Existing Between the Rail-Armature Interface in Railguns," MSE Thesis, The University of Texas at Austin, Dec. 2009.
6. Timothy T. Min, "Computational Studies of Electron Transport and Reaction Rate Models for Argon Plasma," MSE Thesis, The University of Texas at Austin, Aug. 2010.
7. Thirupathiraj Sudharshanraj "Computational Studies of Electron Transport and Reaction Rate Models for Argon Plasma," MSE Thesis, The University of Texas at Austin, Aug. 2021.
8. Roman Stromeyer "Computational Studies of Electron Transport and Reaction Rate Models for Argon Plasma," MSE Thesis, The University of Texas at Austin, Dec. 2021.

PH.D. SUPERVISION COMPLETED:

1. Xiaohui Yuan, "One-dimensional simulation study of atmospheric-pressure glow discharges", PhD Dissertation, Colorado School of Mines, Dec. 2005.
2. Prashanth Kothnur, "Simulation of Direct Current Microdischarges for Microthruster Applications" PhD Dissertation, The University of Texas at Austin, Dec. 2006.
3. Jichul Shin, "A study of direct-current surface discharge plasma for a Mach 3 supersonic flow actuation," PhD Dissertation, The University of Texas at Austin, Aug. 2007.
4. Guangye Chen, "Particle modeling of the VASIMR propulsion helicon discharge," PhD Dissertation, The University of Texas at Austin, Aug. 2008.
5. Thomas Deconinck, "Simulation studies of direct-current microdischarges for electric propulsion," PhD Dissertation, The University of Texas at Austin, Dec. 2008.
6. Daniel F. Berisford, "Thermal phenomena and power balance in a helicon plasma," PhD Dissertation, The University of Texas at Austin, May 2009.
7. Shankar Mahadevan, "Simulation of Direct-Current Surface Plasma Discharges in Air for Supersonic Flow Control," PhD Dissertation, The University of Texas at Austin, May 2010.
8. Hariswaran Sitaraman, "Magneto-hydrodynamics simulation study of high-density thermal plasmas in plasma acceleration devices", Ph.D. Dissertation, The University of Texas at Austin, August 2013.
9. Douglas Breden, "Simulation of atmospheric pressure plasma discharges," PhD Dissertation, The University of Texas at Austin, August 2013.
10. Prem Kumar Paneerchelvam, "Computational modeling of electromagnetic waves and their interactions with microplasmas," PhD Dissertation, The University of Texas at Austin, August 2017.
11. Michael V. Pachuilo, "Study of non-equilibrium plasma streamer discharges in high pressure molecular gases," Ph.D. Dissertation, The University of Texas at Austin, August 2018.

12. Miles Gray, "The RailPac plasma arc," PhD Dissertation, The University of Texas at Austin, August 2018.
13. Ashish Sharma, "Computational studies of streamers on surface and in bubbles suspended in liquids," PhD. Dissertation, The University of Texas at Austin, Dec. 2018.
14. Vivek Subramaniam, "Multi-physics computational modeling of electromagnetic acceleration devices," PhD. Dissertation, The University of Texas at Austin, August 2019.
15. Yunho Kim, "Multi-physics modeling of electromagnetically driven surface plasma discharges," PhD Dissertation, The University of Texas at Austin, Dec. 2019.
16. Dylan Pederson, "Modeling and simulation of electromagnetically-interacting low-temperature plasma discharges for actively controlled metamaterials," PhD Dissertation, The University of Texas at Austin, Jan 2020.
17. Evrim Solmaz, "Investigation of non-ideal effects in a wave-heated dense microplasmas using particle-in-cell Monte Carlo-collision modeling," PhD Dissertation, The University of Texas at Austin, May 2022.
18. Juyeon Lee, "Multi-physics computational modeling of microwave electrothermal thrusters for CubeSat propulsion," PhD Dissertation, The University of Texas at Austin, May 2024.
19. Juan Pablo Barberena-Valencia, "Modeling of intermediate-pressure argon capacitively coupled plasma with uncertainty quantification, PhD Dissertation, The University of Texas at Austin, May 2025.

POST-DOC SUPERVISION COMPLETED:

Dr, Dimty Levko (Oct 2014 – Nov 2017)
Dr. Konstantin Kourtzanidis (Feb 2015 – Jan 2018)
Dr. Violetta Karyofylli (Jan 2020 – June 2021) (part advisee)
Dr. Seung Whan Chung (July 2021 – June 2022) (part advisee)
Dr. Malamas Tsikardis (June 2022 – May 2025) (part advisee)

PH.D./M.S. SUPERVISION IN PROGRESS:

Anant Jain (co-supervisor)
Navheen Murugesan
Mammadbaghir Baghirzadeh
Sai Vishnu Reddy Korsipatti
Jason Stanley
Anjana Kannan

POST-DOC SUPERVISION IN PROGRESS:

Dr. Rui You (Aug 2024 – present)
Dr. Sagar Pokharel (Mar 2025 – present)

OTHER STUDENT RESEARCH COMMITTEES (Current)

Ph.D. Committees - 4
M.S. Committees - 2

OTHER RESEARCH SUPERVISION

Mohit Garg, Undergraduate Research Assistant, 2002-03
Stephen Yeldell, Undergraduate Research Assistant, 2003-04
Romil Doctor, Undergraduate Research Assistant, 2003-04
Divya Thakur, Undergraduate Research Assistant, 2003-04
Sudharshanaraj Thirupattyraj, Undergraduate Research Assistant, 2018-19
Samuel Hart, Undergraduate Research Assistant 2019-2020

VISITING SCHOLARS

Dr. G. Ravi, Scientist, Institute for Plasma Research, Gujarat, India. (visited in Oct 2012).
Prof. Suraj Kumar Sinha, Raman Research Fellow, Govt. of India, University of Pondicherry, Pondicherry, India (Sept. 2013 – Aug 2014).
Dr. Seung-Min Ryu, Samsung Electronics, S. Korea, (Jan 2019 – Jan 2020)

Dr. Jichul Shin, Univ. of Ulsan, S. Korea (Jan 2023-Jan 2024)

Laxminarayan L. Raja, Professor
The University of Texas at Austin
Department of Aerospace Engineering
and Engineering Mechanics

Dr. Raja is Professor in the Department of Aerospace Engineering and Engineering Mechanics at The University of Texas at Austin. He holds the Robert L. Parker Sr. Professorship in Engineering at the Cockrell College of Engineering, The University of Texas at Austin. He has a Ph.D in Mechanical Engineering, M.S. in Nuclear Engineering, and a B. Tech in Aerospace Engineering.

Dr. Raja's research is in the areas of non-thermal and thermal plasmas, chemically reactive flows, and combustion. His research emphasizes both fundamental studies of plasma phenomena and the study of plasma applications in spacecraft electric propulsion, aerodynamic flow control, combustion physics of ignition and flame stabilization with plasmas, and materials processing. The above research is conducted primarily through computational modeling involving multidimensional chemically reactive plasma models and particle models currently being developed by Dr. Raja's group. His group uses high-performance computing approaches to address the computational modeling problems of interest. The research has been funded by the National Science Foundation (NSF), Air Force Office of Scientific Research (AFOSR), Army Research Office (ARO), Naval Research Laboratory (NRL), and the Department of Energy (DoE).

Dr. Raja teaches in the area of fluid mechanics and plasma dynamics and has taught undergraduate and graduate classes in these areas at The University of Texas at Austin.

Dr. Raja has published extensively with over 160 peer-reviewed journal publications and over 250 conference presentations and publications.

Dr. Raja founded Esgee Technologies Inc. to develop and commercialize plasma simulation technology for the analysis and design of semiconductor manufacturing equipment. The company was acquired by Lam Research (NASDAQ:LRCX) in 2022.

Dr. Raja received the prestigious National Science Foundation CAREER award in 2001. He serves on the AIAA Plasma Dynamics and Lasers (PDL) Technical Committee and was the Technical Program Chair for the AIAA SciTech 2014 PDL meeting held in National Harbor, Washington DC in Jan 2014. He was the Secretary for the 65th Gaseous Electronics Conference of the American Physical Society held in Austin, Texas in Oct. 2012. This conference is one of the leading forums for discussions on non-thermal plasmas with a typical attendance of about 400 national and international participants.